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Here, There, WiFi Anywhere

Wireless Web's Spread Is Crossing Our Signals

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Peter Kastner moved from the suburbs to an apartment in Boston last summer while his new home was under construction. As soon as he got set up in the temporary digs, Kastner -- chief technology analyst at the research firm Aberdeen Group -- set up his WiFi home network to enjoy some wireless Web surfing.

Everything worked fine, but in a few weeks he found that the airwaves started getting crowded.

"Around about Labor Day, when all the college students moved back to Boston, all of these [wireless] access points showed up around me," he said. Soon, his laptop started getting dizzy from all the conflicting networks and began dropping connections.

Kastner did a little research into the matter and now worries that WiFi technology will be undercut by its own success.

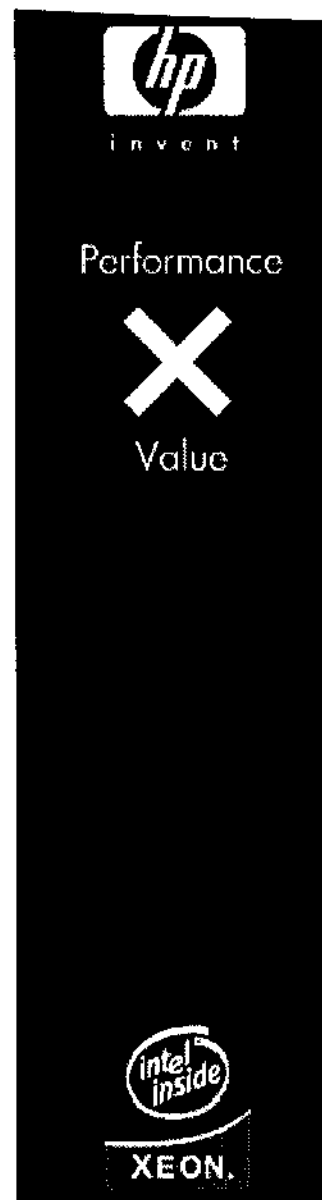
"The end of the WiFi world as we know it is imminent," he later wrote in a report, arguing that the boom of WiFi hardware sales compared with the available airspace in urban areas will lead this year to a wireless Internet traffic jam that in some places could be worse than the Beltway on the Friday of Memorial Day weekend.

Now that WiFi access points can cost under \$100, the technology has jumped quickly from esoteric to everyday. And as more consumers learn the convenience of untethered Internet access, they're also learning what things can stop WiFi from working.

Traffic jams are at the top of that list: When multiple WiFi access points, the hubs of individual wireless networks, sit near each other, WiFi receivers can see senseless noise instead of a clear data stream. This is what happened at the CeBIT computer trade show in Germany last year, where a maze of overlapping WiFi networks stopped many laptops from getting online.

MobileAccess Networks, a Vienna-based firm that installs cellular and WiFi networks inside office areas, regularly runs into this issue. The company uses software originally developed by WiFi enthusiasts to sniff out open wireless connections -- not to find free Internet access, but to know what WiFi channels to avoid when setting up wireless networks in clients' offices.

The treatment for WiFi interference should be familiar to anybody who has wrestled with an old analog cordless phone: Change the channel. The WiFi standard most people use, called 802.11b in technical jargon, allows for 11 different frequencies, clustered around the 2.4 GHz band.



WiFi experts, however, generally recommend choosing from only three of these channels -- 1, 6 and 11 -- to ensure there's enough room between to avoid interference.

Matthew Gast, author of a book about WiFi and an engineering consultant with Trapeze Networks, a California-based company that builds wireless networking equipment, said he didn't think that most people would encounter Kastner's gridlock scenario -- they live sufficiently far apart. But in densely developed areas with many Internet users, problems can arise.

He related a story he'd heard about one Florida suburb where so many signals jammed each other that residents formed an "ad hoc neighborhood spectrum allocation committee" of WiFi users.

"They went from house to house and assigned channels," he said. " 'You're interfering with your neighbor, move to Channel 6.' 'You're interfering with your neighbor, move to Channel 11.' "

But some WiFi problems can't be blamed on neighbors at all -- the enemy may lie within, in the form of other household gadgets that share WiFi's 2.4 GHz frequencies. Cordless phones operating at 2.4 GHz are often pointed to as leading offenders, although many WiFi users report that their 2.4 phones have no effect on their wireless networks.

Jeff Kunst, vice president of marketing at MobileAccess Networks, said he isn't sure that cordless phones cause much interruption in WiFi networks -- but to be on the safe side, he purchased a 900 MHz phone for his WiFi-equipped home office and left his 2.4 GHz phone parked in the kitchen.

If a user suspects a cordless phone is causing interference, Kunst said, moving the cordless phone's base station away from the wireless access point should solve the problem. Experts have sometimes recommended other low-tech ways to level the wireless playing field, such as lowering the phone's antenna or adding a higher-powered WiFi antenna to each computer on the network.

Other products that can tramp on WiFi's wavelength include Bluetooth-equipped cell phones, wireless baby monitors, wireless cameras and microwaves, but few reports point to them as major issues. Then again, say wireless engineers, who knows for sure?

"There's nothing that is black and white when you're talking about wireless," said Frank Hanzlik, managing director of WiFi Alliance, a trade group representing companies that build the wireless equipment.

A third gray area is the role of building structures. Older homes that incorporate plaster or cinderblock can block WiFi signals, while drywall construction generally lets WiFi through. The concrete floors in many apartment buildings and offices are tough obstacles, but the glass in windows is (unsurprisingly) no problem.

"It depends precisely on the type of construction, and I've seen the gamut," said Gast, the author. He recommended that homeowners put their WiFi access point as high inside a home as possible, allowing its signals to "rain down" on the house while avoiding such signal-stopping obstacles at floor level as heavy furniture. Hanzlik seconded this recommendation.

Gast used this approach when he installed a WiFi network in his parents' house, parking the access point on the second floor near the stairway.

One ultimate treatment for some interference problems involves switching to a different chunk of the

electromagnetic spectrum. The Federal Communications Commission has opened up a batch of new frequencies in the neighborhood of 5 GHz that will allow for many more channels.

"It's quite a bit of spectrum," said Coleman D. Bazelon, a vice president with Analysis Group Inc., an economic consulting firm that has studied the issue. He anticipates "no foreseeable traffic jam" there. But most manufacturers have yet to commit to using this frequency. An existing WiFi variant, 802.11a, that employs the 5.8 GHz frequency has yet to take off, mainly because it's not compatible with most existing WiFi devices.

Meanwhile, efforts to tweak WiFi's current protocols to resist interference may forestall any need to move out of the 2.4 GHz neighborhood. Victor Marino, acting president at the Baltimore WiFi Internet provider Oneder Networks, noted that these ongoing improvements make the WiFi market not too different from the computing industry, in which new products can become obsolete the moment they ship.

"You're just seeing the birthing of a new industry here. . . . The more interest there is in this, the quicker the technology will get better," he said.

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